

Marian Catholic High School

AP Physics Course AB

Email:

Web Site:

Mr. Mark Kirzeder

Room 229

mkirzeder@marianhs.org

www.mr-kirzeders-classroom.wikispaces.com

AP PHYSICS-AB COURSE SYLLABUS

Welcome:

Welcome to AP Physics at Marian High School! Please keep this hand-out near the front of your notebook so that you may use it as a reference throughout the academic year. You may use my email address as a last resort in order to contact me with physics-based questions. Please do not rely on this as your primary means of learning because I do not guarantee that I will check my email each day or that I will respond to your inquiry.

Expectations:

This course is designed and taught as a college level course; consequently, I have college level expectations for your progress, behavior, and level of thinking. I expect that you have mastered Algebra II, Trigonometry, and Pre-Calculus. Please seek additional help from me or other teachers if you need to review math concepts, as there will be limited time to do this during class.

Near the conclusion of the academic year, you will be offered the opportunity to complete the AP Physics AB exam on **Monday, May 14, 2012 at 12:00pm**. The entire course will be oriented for your success on this examination. The state of Indiana has waived the fee for taking a science or mathematics Advanced Placement Exam, so you will be able to complete the test free of charge. If you excel on the test, you may receive college credit for your required science courses during your freshman year. The AP Physics B test is a very broad treatment of three semesters of college physics. Thus, we will cover an extensive amount of material before the exam in May.

Finally, due to the intense laboratory nature of this course, you will also be responsible for completing numerous in-class experiments. Each experiment will require a lab report in which you will analyze the data, estimate error, discuss the validity of the experiment, and discuss further research opportunities. You will also be responsible for designing, conducting, and presenting a set of your own experiments to the class.

Textbooks:

Primary Textbook

Cutnell, John D., and Kenneth W. Johnson (2004). *Physics*, 8th Edition

Hoboken, NJ: John Wiley & Sons. ISBN 978-0-470-37924-0

Supplemental Textbook

Henderson, Hugh (2004) *Student Study Guide for Advanced Placement Physics B*.

Hoboken, NJ: John Wiley & Sons. ISBN 0-471-26850-X

What you will need:

1. loose leaf paper (not spiral-bound notebooks)
2. black/blue pens
3. pencils
4. access to a computer with internet connection
5. Highly recommended: Graphing Calculator (TI-83, 83Plus, 85, 86, or 89). Any calculator with a QWERTT keyboard cannot be used on the exam or in this class.
6. carbon copy physical science laboratory manual purchased from the bookstore

What you will cover:**Approximate date and time:****I. Newtonian Mechanics (35%)****10 WEEKS**

- A. Kinematics (7%) (including vectors, vector algebra and components, coordinate systems, displacement, velocity, and acceleration)
 - 1. Motion in one dimension
 - 2. Motion in two dimensions, projectile motion
- B. Newton's laws of motion (9%)
 - 1. Static equilibrium (First law)
 - 2. Dynamics of a single particle (Second law)
 - 3. Systems of two or more bodies (Third law)
- C. Work, energy, power (5%)
 - 1. Work and work-energy theorem
 - 2. Conservative forces and potential energy
 - 3. Conservation of energy
 - 4. Power
- D. Systems of particles, linear momentum (4%)
 - 1. Center of mass
 - 2. Impulse and momentum
 - 3. Conservation of linear momentum, collisions
- E. Circular motion and rotation (4%)
 - 1. Uniform circular motion
 - 2. Torque and rotational statics
- F. Oscillations and gravitation (6%)
 - 1. Simple harmonic motion (dynamics and energy relationships)
 - 2. Mass on a spring
 - 3. Pendulum and other oscillations
 - 4. Newton's law of gravity
 - 5. Orbits of planets and satellites
 - a. Circular

II. Fluid Mechanics and Thermal Physics (15%)**4 WEEKS**

- A. Fluid Mechanics (6%)
 - 1. Hydrostatic pressure
 - 2. Buoyancy
 - 3. Fluid flow continuity
 - 4. Bernoulli's equation
- B. Temperature and heat (2%)
 - 1. Mechanical equivalent of heat
 - 2. Heat Transfer and Thermal expansion
- C. Kinetic theory and thermodynamics (7%)
 - 1. Ideal gases
 - a. Kinetic model
 - b. Ideal gas law
 - 2. Laws of thermodynamics
 - a. First law (including processes on pV diagrams)
 - b. Second law (including heat engines)

III. Electricity and Magnetism (25%)**8 WEEKS**

- A. Electrostatics (5%)
 - 1. Charge, field, and potential
 - 2. Coulomb's law and field and potential of point charges
 - 3. Fields and potentials of other charge distributions

- B. Conductors and capacitors (4%)
 - 1. Electrostatics with conductors
 - 2. Capacitors
 - a. Parallel plate
- C. Electric circuits (7%)
 - 1. Current, resistance, power
 - 2. Steady-state direct current circuits
 - 3. Capacitors in circuits
- D. Magnetic Fields (4%)
 - 1. Forces on moving charges in magnetic fields
 - 2. Forces on current-carrying wires in magnetic fields
 - 3. Fields of long current-carrying wires
- E. Electromagnetism (5%)
 - 1. Electromagnetic induction (including Faraday's law and Lenz's law)

IV. Waves and Optics (15%)

4 WEEKS

- A. Wave motion (including sound) (5%)
 - 1. Properties of traveling waves
 - 2. Properties of standing waves
 - 3. Doppler Effect
 - 4. Superposition
- B. Physical optics (5%)
 - 1. Interference and diffraction
 - 2. Dispersion of light and the electromagnetic spectrum
- C. Geometric optics (5%)
 - 1. Reflection and refraction
 - 2. Mirrors
 - 2. Lenses

V. Atomic and Nuclear Physics (10%)

2 WEEKS

- A. Atomic physics and quantum effects (7%)
 - 1. Photons, the photoelectric effect, Compton scattering, x-rays
 - 2. Atomic energy levels
 - 3. Wave-particle duality
- B. Nuclear physics (3%)
 - 1. Nuclear reactions
 - 2. Mass-energy equivalence

VI Review

2 WEEKS

- A. Review of physics material during class
 - 1. Answer questions
 - 2. Conduct demonstrations
 - 3. Student re-teaching sessions
- B. Review of physics material at home
 - 1. Complete practice AP exams
 - 2. Complete practice problems
- C. Complete AP exam

Weighting and Categorization of Grades by Quarter:

Homework will include:

- Daily Assignments
- PPODs
- Problem Sets
- Oral Questions

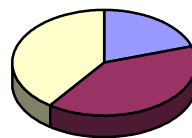
Quizzes will include:

- Individual Quizzes
- Lab Reports

Tests/Performance Assessments will include:

- Unit Tests
- Unit Performance Assessments
- Projects

**Tests/Performance
Assessments
40%**



**Homework
20%**

**Quizzes/Labs
40%**

Procedure for Grading:

Homework:

1. Homework will be given primarily on a daily basis.
2. It will be collected randomly and graded according to the rubric below.
3. PPODs scores will be collected on a unit-by-unit basis. Be sure to keep all PPODs together. If you miss a PPOD due to an absence, there is no required make up work.
4. Oral questions can be graded at any time. See below for rubric.
5. Problem sets may take several days to complete and will be graded

Area	Advanced	Proficient	Basic	Unsatisfactory	No Evidence
Daily Work	<p style="text-align: center;">4</p> <p>1) All pieces of the assignment are attempted, 2) the work or thought process is shown and is readable, 3) work is completed in blue/black ink or pencil, and 4) your name appears in upper right corner.</p>	<p style="text-align: center;">3</p> <p>One of the aforementioned requirements is not fully satisfied or only 75 percent of the assignment is attempted.</p>	<p style="text-align: center;">2</p> <p>Two of the aforementioned requirements are not fully satisfied or only 50 percent of the assignment is attempted.</p>	<p style="text-align: center;">2</p> <p>Three of the aforementioned requirements are not fully satisfied or only 25 percent of the assignment is attempted.</p>	<p style="text-align: center;">0</p> <p>No assignment is turned in or no portion of the assignment is attempted.</p>
Oral Questions	<p style="text-align: center;">4</p> <p>Answer is complete in concept and mathematics and represents full understanding of the questions context.</p>	<p style="text-align: center;">3</p> <p>Answer is partially complete in concept or mathematics or lacks complete understanding of how the lab fits into the course.</p>	<p style="text-align: center;">2</p> <p>Answer is partially complete in mathematics but lacks a true conceptual understanding of the larger topic being addressed.</p>	<p style="text-align: center;">1</p> <p>Answer lacks specific knowledge of the concepts and mathematics involved and shows little evidence of critical thinking.</p>	<p style="text-align: center;">0</p> <p>No response or "I don't know."</p>

Quizzes:

1. The major portion of the quiz grades will be comprised from laboratory experiments. Although labs may be completed in groups, each student will hand in a final lab report that is completed independently and individually.
2. Complete all portions of the lab report that are assigned. You will be given a typical lab report format and you are expected to follow it as closely as possible.
3. There will be two quizzes each unit. One will cover only material in the current unit of study while the other will be cumulative. These quizzes may range from 3-10 points.

Tests/Performance Assessments:

1. Exams will be taken individually during each unit.
1. Performance Assessments may be given at the end of each unit. Performance Assessments may be individual or group based. All group assessments will also have a significant portion that is completed by the individual student.
2. Rubrics will be handed out in advance for performance assessments, projects, and presentations so that you will know what I expect.

Weighting and Categorization of Grades by Semester: